

REMARKS

Claims 1-6 are active in the present application. Claims 4-6 are new claims. Claim 1 has been amended for clarity. The melt flow rate of the propylene-ethylene block copolymer of Claim 1 has been limited to a MFR of from 12 to 16 g/10 min. Support for the amendment is found in the specification on page 3, lines 23-24. Support for new Claims 4-6 is found in the original claims and in the Examples on pages 15-17. No new matter is believed to have been added by this amendment.

REQUEST FOR RECONSIDERATION

The present invention is drawn to a propylene-ethylene block copolymer composition that offers advantages in applications such as exterior parts for automobiles. The claimed composition contains a nucleating agent and a propylene-ethylene block copolymer. Importantly, the presently claimed propylene-ethylene block copolymer compositions are able to provide the mechanical strength necessary for automotive applications without the addition of other additives. Prior art compositions containing other components require additional processing and handling steps for their preparation. This in turn adds extra cost to the manufacturing process.

The propylene-ethylene block copolymer composition of the present invention is further characterized by its physical and chemical properties including melt flow rate (MFR) and xylene (in)solubles. The propylene-ethylene block copolymer compositions of the present application are suitable for application in automotive parts.

The claims were rejected under 35 U.S.C. § 103(a) in view of the combination of two primary references; Watanabe (EP 699711) and Abe (U.S. 5,484,824). The primary references specifically state that improved mechanical strength (e.g., Izod impact strength)

can be achieved in the prior art compositions by the inclusion of an additional rubber component in the compositions. In Watanabe this is disclosed on page 2, lines 30-34, and in Abe this is disclosed in column 2, lines 56-57 and column 1, lines 44-45. Applicants submit that in view of the teachings of the Watanabe and Abe patents, wherein it is disclosed and claimed that the prior art compositions should contain an additional rubber component in order to provide the impact strength required for automotive applications, the presently claimed invention, wherein an additional rubber component is not required, cannot be obvious. There is no teaching within the Watanabe or Abe patents that would lead one of ordinary skill in the art to prepare propylene-ethylene copolymer compositions for automotive applications requiring excellent mechanical properties without including a rubber component.

Claim 1 was rejected under 35 U.S.C. § 103(a) as unpatentable over Watanabe in view of Kamakura (U.S. 5,543,454), Watanabe II (U.S. 4,621,114), and Sumitomo (U.S. 6,201,090). Applicants traverse the rejection in view of the fact that the presently claimed melt flow range is not disclosed or claimed in the prior art.

It is stated in the Office Action on page 6, lines 10-11 and page 6, line 20 through page 7, line 6 that one of the differences between the Watanabe patent and the presently claimed invention is the melt flow rate. In order to make a showing of obviousness, the Examiner has combined the disclosure of Kamakura with Watanabe. It is stated that the Kamakura patent discloses propylene resin compositions having an MFR of 9-15 g/10 min. The disclosure on column 2, lines 63-67 is provided as support.

The melt flow rate in column 2, lines 63-67 of the Kamakura patent describes only one component of the prior art composition. The MFRs of the prior art *compositions* are presented in Table 4 wherein MFRs of from 5.2 to 6.1 g/10 min are provided. These MFRs

are outside the MFR range for the composition of presently claimed invention (10-18 g/10 min). Thus, the combination of Kamakura with Watanabe does not contain all of the elements of the presently claimed invention. Applicants submit that the Office has not established a *prima facie* case of obviousness. Applicants respectfully request the rejection under 35 U.S.C. § 103(a) be withdrawn.

Claims 1-3 were further rejected under 35 U.S.C. § 103(a) as unpatentable over Abe in combination with Kamakura, Watanabe II, Sumitomo, and Nakazima (EP 280297).

As already discussed above, the Abe reference teaches that a rubber component is necessary in order to improve the impact strength of automotive parts manufactured from propylene-ethylene block copolymers. In column 1, lines 39-40, it is stated “bumpers made of a crystalline propylene-ethylene block copolymer are excellent in thermal properties such as stiffness and thermal deformation temperature, *but are not satisfactory in impact strength*” (emphasis added). The Abe patent discloses that a rubber component (component (C)) is included in the invention (column 2, lines 58-59). There is no indication in the Abe patent that the desired physical properties (impact strength) can be provided by compositions containing only a propylene-ethylene block copolymer.

With regards to the melt flow rate of the propylene-ethylene block copolymer, the Abe patent exemplifies only propylene-ethylene materials outside the presently claimed range of 12-16 g/10 min (see Table 3 of the Abe patent). The patent discloses five propylene-ethylene copolymers in Table 3 (EPR-1) - (EPR-5). The first four propylene-ethylene copolymers have melt flow values significantly greater than that presently claimed (21 g/10 min vs 16 g/10 min (max.)). EPR-5 has a melt flow of 17 g/ 10 min. When EPR-5 is used in the prior art examples (see Comparative Example 14; column 25, lines 39-46) the resulting composition provides the poorest impact strength (see Table 7). One of ordinary skill in the

art is likely to conclude that when the propylene-ethylene copolymer is of low melt flow (e.g., within the presently claimed range) the resulting composition is expected to exhibit poor impact strength. Therefore the Abe patent teaches away from the presently claimed invention and the presently claimed invention is not obvious in view of the combination of the Abe patent with the other prior art relied upon by the Examiner.

Lastly, Claims 1 and 3 were rejected under 35 U.S.C. § 103(a) as obvious over the combination of Endo (U.S. 4,596,833) in view of Kamakura, Watanabe, and Sumitomo.

The Examiner states that the Endo patent discloses a composition for automotive parts that contains a nucleating agent that is identical to the methylene bis(2,4-di-t-butylphenol) acid sodium phosphate (NA-11) of the present invention. Applicants traverse the Examiner's statement, noting that the nucleating agents of the Endo patent are not identical to the presently claimed methylene bis(2,4-di-t-butylphenol) acid sodium phosphate.

In both the present application and the reference patent, the nucleating agent is identified by the tradename "NA-11" (see the Examples). Although both the methylene bis(2,4-di-t-butylphenol) acid sodium phosphate and the nucleating agent of the Endo reference have "NA-11" tradenames, the materials are produced by different companies, namely Asahi Denka Kogyo Co., Ltd. and Adaka Argus Chemical Company, Ltd respectively.

The nucleating agents of the Endo patent are shown diagrammatically in column 2 of the patent. Two nucleating agents are shown, (I) and (II). Both of these chemical structures are substantially different from the presently claimed methylene bis(2,4-di-t-butylphenol) acid sodium phosphate as evidenced by the attachment of only one t-butyl group to the phenyl groups in either of the prior art nucleating agents (I) or (II). The methylene bis(2,4-di-t-butylphenol) acid sodium phosphate of the present invention has two butyl groups on the

phenyl rings as evidenced by the chemical name (methylene bis(2,4-di-t-butylphenol)). The nucleating agents of the Endo patent are therefore not identical to the presently disclosed methylene bis(2,4-di-t-butylphenol) acid sodium phosphate.

The Examiner has not established a *prima facie* case of obviousness since the nucleating agent of the prior art is different from the methylene bis(2,4-di-t-butylphenol) acid sodium phosphate of the present invention. Applicants respectfully request the withdrawal of the rejection in view of the Endo, Kamakura, Watanabe, and Sumitomo patents.

As presented above, the presently claimed invention is not obvious in view of the prior art cited. Cumulatively, the prior art lacks a teaching towards a propylene-ethylene block copolymer that is capable of providing the impact strength for automotive-type applications that is demonstrated by the presently claimed composition.

New Claims 4-6 are drawn to a composition which consists essentially of the propylene-ethylene block copolymer of original Claim 1. As disclosed in the prior art cited by the Examiner, the addition of a rubber component to a thermoplastic material can affect the composition's impact strength and other physical properties. In the new claims, the compositions are limited to consisting essentially of the propylene-ethylene block copolymer and methylenebis(2,4-di-t-butylphenol) acid sodium phosphate. Thus additional components which substantially affect the impact strength of the overall composition are excluded. The compositions of new Claims 4-6 are novel and not obvious in view of the prior art cited.

The specification has been amended in the Abstract. The Abstract has been amended to conform to the requirements presented in the Office Action.

The amendment to the claims obviates the rejections under 35 U.S.C. §112, second paragraph.


Applicants note that Izod impact strength is sometimes expressed in terms of energy per area. Such units take the form of, for example, J/m² (joules per square meter). The Sumitomo reference cited by the Examiner in the Office Action provides Izod impact strength in units of kJ/m² (see for example, Table 1). Applicants provide a measurement method (JIS K7110) for Izod impact strength in energy per area units. The European Patent (EP 0699711) notes that the Japanese method for measuring Izod impact strength (JIS K7110) closely corresponds with ASTM D256 (page 7, lines 22-23). Two U.S. patents to Buckman (5,478,892) and Winter (5,416,153) are provided as further support that Izod impact strength is measured in the units disclosed in the present application. In each of these U.S. patents Izod impact strength is presented in units of energy per area (J/mm²). Applicants submit that measuring impact strength in terms of units of energy per area is recognized in the art and no correction is required.

Applicants note that a Information Disclosure Statement was filed with the Office on April 4, 2002. The IDS, including a Form PTO-1449, contains seven references cited on a European Search Report. Applicants respectfully request the Examiner sign and initial the Form PTO-1449 and return a copy with the next communication from the Office.

Applicants submit the amendment to the claims places all claims in condition for allowance. Applicants respectfully request the withdrawal of the outstanding rejections and the passage of all now pending claims to Issue.

Respectfully submitted,

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IN THE CLAIMS

--1. (Amended) A propylene-ethylene block copolymer composition for automobile exterior parts, comprising a propylene-ethylene block copolymer having a melt flow rate (mfr) of 12 to 16 g/10 min and a nucleating agent comprising methylenebis(2,4-di-t-butylphenol) acid sodium phosphate, said nucleating agent [which is] blended with the propylene-ethylene block copolymer in an amount of 300 to 2,000 ppm [upon granulation thereof] when the propylene-ethylene block copolymer is granulated, and said composition having:

(a) a melt flow rate (MFR) of 10 to 18 g/10 min when measured at 230°C under a load of 2.16 kg (21.2N);

(b) [an ordinary temperature] a 25°C xylene insoluble having a stereoregularity index [mmmm] fraction of 98.9% or higher when measured by C¹³-NMR; and

(c) [an ordinary temperature] a 25°C xylene soluble characterized by:

(c-1) having a content of 22 to 28% by weight based on the composition;

(c-2) comprising only a single component with respect to a relaxation time T1 measured by pulse NMR; and

(c-3) satisfying the following formula (I):

$$y \leq 0.0014x^3 - 0.0897x^2 - 1.0593x + 231.6 \quad (I)$$

wherein x is an ethylene content (% by weight) measured by ^{13}C -NMR and y is the relaxation time T1 (msec) measured by pulse NMR.--

Claims 4-6 (New).